

What is claimed is:

1. A phosphatidylinositol 4,5-bisphosphate (PIP2) indicator, said indicator comprising:
 - 5 (a) a first polypeptide comprising:
 - (i) a pleckstrin homology (PH) domain; and
 - (ii) a donor fluorescent domain
 - (b) a second polypeptide comprising:
 - 10 (i) a pleckstrin homology (PH) domain; and
 - (ii) an acceptor fluorescent domain;wherein fluorescence resonance energy transfer (FRET) between said donor domain and said acceptor domain indicates PIP2 levels.
2. The indicator of claim 1, wherein said PH domain
15 is a PLC δ 1 or PLC β PH domain.
3. The indicator of claim 1, wherein said donor fluorescent domain is selected from the group consisting of a GFP and a dsRED.
4. The indicator of claim 1, wherein said donor
20 fluorescent domain is a CFP.
5. The indicator of claim 1, wherein said acceptor fluorescent domain is selected from the group consisting of a GFP and a dsRED.
6. The indicator of claim 1, wherein said acceptor
25 fluorescent domain is a YFP.
7. A cell comprising the indicator of claim 1.

8. A nucleic acid kit, the nucleic acid molecule components of which encode a PIP2 indicator, said indicator comprising:

(a) a first polypeptide comprising:

- 5 (i) a PH domain; and
 (ii) a donor fluorescent domain

(b) a second polypeptide comprising:

- (i) a PH domain; and
 (ii) an acceptor fluorescent domain;
10 wherein fluorescence resonance energy transfer (FRET) between said donor domain and said acceptor domain indicates PIP2 levels.

9. The kit of claim 8, wherein said PH domain is a PLC δ 1 or PLC β PH domain.

- 15 10. The kit of claim 8, wherein said donor fluorescent domain is selected from the group consisting of a GFP and a dsRED.

11. The kit of claim 8, wherein said donor fluorescent domain is a CFP.

- 20 12. The kit of claim 8, wherein said acceptor fluorescent domain is selected from the group consisting of a GFP and a dsRED.

13. The kit of claim 8, wherein said acceptor fluorescent domain is a YFP.

- 25 14. A cell expressing the nucleic acid molecule components of the kit of claim 8.

15. A method of indicating PIP2 levels in a cell, comprising:

(a) providing a cell containing the PIP2 indicator of claim 1; and

5 (b) determining FRET between said donor fluorescent domain and said acceptor fluorescent domain,

wherein FRET between said donor domain and said acceptor domain indicates PIP2 levels in the cell.

16. The method of claim 15, wherein said PH domain
10 is a PLC δ 1 or PLC β PH domain.

17. The method of claim 15, wherein said donor fluorescent domain is selected from the group consisting of a GFP and a dsRED.

18. The method of claim 15, wherein said donor
15 fluorescent domain is a CFP.

19. The method of claim 15, wherein said acceptor fluorescent domain is selected from the group consisting of a GFP and a dsRED.

20. The method of claim 15, wherein said acceptor
20 fluorescent domain is a YFP.

21. The method of claim 15, wherein said cell recombinantly expresses a G-protein coupled receptor.

22. A method of identifying a compound that modulates PIP2 levels in a cell, comprising:

(a) contacting a cell containing the PIP2 indicator of claim 1 with one or more test compounds; and

5 (b) determining FRET between said donor fluorescent domain and said acceptor fluorescent domain following said contacting,

wherein increased or decreased FRET following said contacting indicates that said test compound is a
10 compound that modulates PIP2 levels in the cell.

23. The method of claim 22, wherein said PH domain is a PLC δ 1 or PLC β PH domain.

24. The method of claim 22, wherein said donor fluorescent domain is selected from the group consisting
15 of a GFP and a dsRED.

25. The method of claim 22, wherein said donor fluorescent domain is a CFP.

26. The method of claim 22, wherein said acceptor fluorescent domain is selected from the group consisting
20 of a GFP and a dsRED.

27. The method of claim 22, wherein said acceptor fluorescent domain is a YFP.

28. The method of claim 22, wherein said contacting is by administration of said test compound to the
25 exterior of said cell.

29. The method of claim 22, wherein said contacting is by recombinant expression of said test compound in said cell.

30. The method of claim 22, wherein said cell
5 recombinantly expresses a G-protein coupled receptor.